IN THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (*Currently Amended*) A method of calibrating a reticle stage of a lithographic system, comprising:

directing a projection beam through a reticle such that said lithographic system generates an image of said reticle;

measuring a set of height offsets based on said reticle image;

decomposing said set of measured height offsets ~~in accordance with~~ into a plurality of distortional factors;

determining reticle deformation attributes based on said distortional factors;

determining reticle stage deformation attributes based on said distortional factors and said reticle deformation attributes; and

calibrating said reticle stage based on said reticle stage deformation attributes.

2. (*Original*) The method of Claim 1, wherein said image generation includes scanning, within a slit area, an identifiable marker positioned on said reticle.

3. (*Original*) The method of Claim 1, wherein said image generation includes implementing sensors to detect vertical position focus levels.

4. (*Currently Amended*) The method of Claim ~~1~~ 2, wherein said image generation includes exposing said reticle on a substrate.

5. (*Currently Amended*) The method of Claim 1, wherein said distortional factors are characterized by:

$$Z_{meas}(x,y_{sl},y_{rs}) = z_0 + (FC_{lens}+FC_{xTIS})x^2 + (Ry_{sl} + ry_0 + Ry_r)x + (Rx_{sl} + rx_0 + W_r + W_{rs})y_{sl} + (W_r + W_{rs})y_{rs} + (C_{sl} + C_r)x \cdot y_{sl} + (C_{rs} + C_r)x \cdot y_{rs} + (Q_r + Q_{rs})y_{rs}^2 + Q_r 2 \cdot y_{sl} \cdot y_{rs} + (FC_{lens}+FC_{yTIS} + Q_r)y_{sl}^2$$

where

$Z_{meas}(x,y_{sl}, y_r)$ represents the height of ~~said~~ an identifiable marker with said reticle stage at position y_{rs} and in ~~said~~ a scan slit position x, y_{sl};

y_{rs} represents the position of said reticle stage in y;

x,y_{sl} represents the position of a sensor operative with said identifiable marker;

y_r represents the position on said reticle in y ($y_r = y_{rs} + y_{sl}$);

z_0 represents the height offset of said identifiable marker, a lens, said reticle, and said reticle stage;

FC_{lens} represents field curvature distortion of said lens;

FC_{xTIS} represents 2nd order warp distortion of TIS plate in x;

FC_{yTIS} represents 2nd order warp distortion of the TIS plate in y;

Ry_{sl} represents said scan slit tilt in x of said identifiable marker;

Ry_r represents the tilt offset of said reticle in x;

ry_o represents the tilt offset of said reticle stage in x;

~~Ry_{rs} represents the tilt offset of said reticle and reticle stage;~~

Rx_{sl} represents said scan slit tilt of said identifiable marker at position y_{rs};

rx_o represents the tilt offset of said reticle stage at position y_{rs};

W_{sl} represents the wedge distortion in said scan slit;

W_r represents the wedge distortion of said reticle;

W_{rs} represents the wedge distortion of said reticle stage;

~~Q_{sl} represents the quadratic contribution of said scan slit;~~

Q_r represents the quadratic wedge distortion of said reticle;

Q_{rs} represents the quadratic wedge distortion of said reticle stage;

C_{sl} represents the corkscrew distortion of said scan slit;

C_r represents the corkscrew distortion of said reticle; and

C_{rs} represents the corkscrew distortion of said reticle stage.

6. (*Currently Amended*) The method of Claim ~~2~~ 4, wherein said exposing includes maintaining said reticle fixed at a certain position while performing scanning measurements of said identifiable marker as said identifiable marker shifted to a plurality of predetermined positions.

7. (*Currently Amended*) The method of Claim ~~2~~ 4, wherein said exposing includes maintaining said reticle fixed at a certain position while performing scanning measurements as an identifiable marker is shifted to a plurality of predetermined positions.

8. (*Original*) The method of Claim 2, where said identifiable marker includes sets of marks that are mirror images of each other and said exposing includes performing scanning measurements in two orientations.

9. (*Original*) The method of Claim 1, wherein said calibrating includes adjusting an actuation mechanism associated with said reticle stage to compensate for said reticle stage deformation attributes.

10. (*Currently Amended*) A system for calibrating a reticle stage of a lithographic system, comprising:

an exposure apparatus configured to direct a projection beam of radiation through a reticle, supported by said reticle stage, in order to generate an image of said reticle;

a measurement apparatus for measuring a set of height offsets based on said reticle image;

a processing mechanism configured to decompose said set of measured height offsets ~~in accordance with~~ into a plurality of distortional factors, to determine reticle deformation attributes based on said distortional factors, and to determine reticle stage deformation attributes based on said distortional factors and said reticle deformation attributes; and

a reticle stage actuation mechanism to control position of said reticle stage, wherein said reticle stage actuation mechanism is adjusted in calibrating said reticle stage based on said reticle stage deformation attributes.

11. (*Original*) The system of Claim 10, wherein said exposure apparatus generates said reticle image by scanning, within a slit area, an identifiable marker positioned on said reticle.

12. (*Original*) The system of Claim 10, wherein exposure apparatus generates said reticle image by implementing sensors to detect vertical position focus levels.

13. (*Currently Amended*) The system of Claim ~~10~~ 11, wherein exposure apparatus generates said reticle image by exposing said reticle on a substrate.

14. (*Currently Amended*) The system of Claim 10, wherein said distortional factors are characterized by:

$$Z_{meas}(x,y_{sl},y_{rs}) = z_0 + (FC_{lens}+FC_{xTIS})x^2 + (Ry_{sl} + ry_0 + Ry_r)x + (Rx_{sl} + rx_0 + W_r + W_{rs})y_{sl} + (W_r + W_{rs})y_{rs} + (C_{sl} + C_r)x \cdot y_{sl} + (C_{rs} + C_r)x \cdot y_{rs} + (Q_r + Q_{rs})y_{rs}^2 + Q_r 2 \cdot y_{sl} \cdot y_{rs} + (FC_{lens}+FC_{yTIS} + Q_r)y_{sl}^2$$

where

$Z_{meas}(x,y_{sl}, y_r)$ represents the height of ~~said~~ an identifiable marker with said reticle stage at position y_{rs} and in ~~said~~ a scan slit position x, y_{sl};

y_{rs} represents the position of said reticle stage in y;

x,y_{sl} represents the position of a sensor operative with said identifiable marker;

y_r represents the position on said reticle in y ($y_r = y_{rs} + y_{sl}$);

z_0 represents the height offset of said identifiable marker, a lens, said reticle, and said reticle stage;

FC_{lens} represents field curvature distortion of said lens;

FC_{xTIS} represents 2nd order warp distortion of TIS plate in x;

FC_{yTIS} represents 2nd order warp distortion of the TIS plate in y;

Ry_{sl} represents said scan slit tilt in x of said identifiable marker;

Ry_r represents the tilt offset of said reticle in x;

ry_o represents the tilt offset of said reticle stage in x;

~~Ry_{rs} represents the tilt offset of said reticle and reticle stage;~~

Rx_{sl} represents said scan slit tilt of said identifiable marker at position y_{rs};

rx_o represents the tilt offset of said reticle stage at position y_{rs};

W_{sl} represents the wedge distortion in said scan slit;

W_r represents the wedge distortion of said reticle;

W_{rs} represents the wedge distortion of said reticle stage;

~~Q_{sl} represents the quadratic contribution of said scan slit;~~

Q_r represents the quadratic wedge distortion of said reticle;

Q_{rs} represents the quadratic wedge distortion of said reticle stage;

C_{sl} represents the corkscrew distortion of said scan slit;

C_r represents the corkscrew distortion of said reticle; and

C_{rs} represents the corkscrew distortion of said reticle stage.

15. (*Currently Amended*) The system of Claim ~~11~~ 13, wherein said exposing by said exposure apparatus includes maintaining said reticle fixed at a certain position while performing scanning measurements of said identifiable marker as said identifiable marker shifted to a plurality of predetermined positions.

16. (*Currently Amended*) The system of Claim ~~11~~ 13, wherein said exposing by said exposure apparatus includes maintaining said reticle fixed at a certain position while performing scanning measurements as an identifiable marker is shifted to a plurality of predetermined positions.

17. (*Original*) The system of Claim 11, where said identifiable marker includes sets of marks that are mirror images of each other and said exposing includes performing scanning measurements in two orientations.

18. (*New*) The method of Claim 1, wherein said plurality of distortional factors comprise at least one of reticle quadratic wedge distortion, reticle linear wedge distortion, reticle corkscrew distortion, reticle stage quadratic wedge distortion, reticle stage linear wedge distortion, and reticle stage corkscrew distortion.

19. (*New*) The system of Claim 10, wherein said plurality of distortional factors comprise at least one of reticle quadratic wedge distortion, reticle linear wedge

distortion, reticle corkscrew distortion, reticle stage quadratic wedge distortion, reticle stage linear wedge distortion, and reticle stage corkscrew distortion.